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The Identification of the Sacred "Chiton" (*Sarapis*) of Pharaoh Alexander the Great in Tomb II at Vergina, Macedonia, Greece

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ABSTRACT

An unidentified material was found in the Royal Tomb II of Vergina, Greece within the golden ossuary (*larnax*) with the bones of the male occupant and his golden wreath. Physical, chemical, and microscopic analyses showed that it is a cotton textile dyed purple which sandwiches one or two layers of a whitish material made mainly of the mineral huntite. The presence of cotton is especially significant, as it downdates Tomb II. The physical description exactly fits the description in the ancient sources of the sacred Persian *mesoleucon sarapis* which belonged to Pharaoh and King Alexander the Great and as such it was the most precious object in antiquity. This *sarapis* is also depicted in the frieze of Tomb II on the sixth hunter, identified as Alexander. The Persian gazelle, depicted in the frieze also downdates Tomb II. Thus, many of the artifacts in Tomb II belonged to Alexander the Great.

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Introduction

There is a long-running debate over the identities of the occupants of the 4th century B.C. Royal Tombs I and II at Vergina, northern Greece. However, the traditional speculation that Tomb II belongs to Philip II has repeatedly been refuted (see e.g., Bartsiokas, Arsuaga, and Brandmeir 2023; Huber 2019). As a result, some of the artifacts in Tomb II are consistent with the insignia that belonged to Alexander the Great. Here, more artifacts from Tomb II are shown to belong to Alexander the Great, such as his "chiton" (*sarapis*), the diadem, the scepter, and perhaps the golden wreath.

The garments of ancient Macedonians

A chiton was a tunic-like, single-piece garment worn under a chlamys. A chlamys was a cloak or cape sometimes worn over the chiton (see e.g., Crane 2024; Diggle 2021; Faklaris 2011; Oxford Latin Dictionary 1968). Purple was reserved for the elite (Negron 2021, 16). For the regalia of Alexander, Negron's (2021) is one of the best reviews.

The garments of ancient Persians

Among Persians, purple was associated with royalty (Negron 2021, 17): Cyrus' and Darius' royal costumes included a purple tunic with a white middle (*χιτώνα μεσόλευκον, chiton mesoleukos, tunicam mesoleucum* by Metz Epitome), which no one else was allowed to wear but the Great Kings (*Arrian Anabasis* 6.29.5–6; Xenophon *Cyr.* 8.3.13). The white middle appeared as a stripe. Such stripes are depicted in Persian art (see e.g., Gow 1928, figs. 1, 3, 5; Graeve 1970, fig. 69). The chiton was also called *chiton dialeukos* (*διάλευκον χιτώνα*; Diodorus 17.77.4–5; Plutarch *Alex* 51.5).

The Cambridge Greek Lexicon suggests "shot with white" as a translation for *mesoleukos*, though it then expands on the prefix and suggests "middle." The prefix "meso" means "the one that lies in between," i.e., in the middle (Babiniotis 1998; Liddell and Scott 1927). Thus, "meso-leukos" is the purple tunic with a white part in the middle (Baynham 1995, 65; Metz Epitome 2; Xenophon *Cyr.* 8.3.13). The Oxford Latin Dictionary suggests "a gem or class of gem streaked with white" for mesoleucos, though it then expands on the prefix and suggest a "central band." The entry cites Pliny (NH 37.174; see also Baynham 1995), who uses "mesoleucos" to describe a stone marked by a white stripe. Of course, the white stripe in this geological specimen was not only a superficial stripe but was part of a white geological layer within the stone, sandwiched between the darker layers, and of course a stone can have more than one white layer. This is also confirmed by the description of Curtius (3.3.17) in which it is a "purple tunic interwoven with a white middle" (*purpureae tunicae medium album intextum erat*). Thus, the various translations of it—such as "white trimmings," "white adornments," or "white stripes" at the edge of a garment (see e.g., Collins 2012)—are not exactly accurate (see e.g., Olbrycht 2014). This is why "meso-leukos" should be translated as "a purple chiton with a white middle layer" (literally "white in the middle"), not a white stripe, as no word for stripe exists in the ancient texts. The Persian mesoleucos chiton was called sarapis in Persian (Collins 2012, 388–389; Gow 1928, 146).

The Cambridge Greek Lexicon suggests "pure white" for "dialeukos," though it does expand on the prefix and suggests either "in the midst of," or "amid," or "throughout." The Oxford Latin Dictionary suggests "partially white" for "dialeucos." The prefix "dia" denotes a divide (separation) between parts (Babiniotis 1998). Thus, "dia-leukos" is a purple tunic with a white part which lies between the purple parts. This implies that the white part was not superficial at the edge of the tunic but was a layer sandwiched between the purple ones, appearing as a white stripe at the edge of the tunic. This is in accord with the translation of " … *διάλευκον*

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ενεδύσατο χιτώνα … " as "[Alexander] … put on the robe (*chiton*) with the central white stripe … " (Diod. *Bibliotheke historike* 17.77.4-5; Stewart 1993, 353). Thus, it is deduced that in most cases, dialeucos as mentioned by Ephippus has the same meaning as mesoleucos as mentioned by Diodorus and Plutarch (Spawforth 2012, 182–183; see e.g., Olbrycht 2014, 45–46). Darius in the Alexander Mosaic at Pompeii appears to wear a white garment. However, this representation is of limited use, given that the mosaic is so late and not primary iconographic evidence (Collins 2012, 387). The Great Kings also had diadems wrapped around the base of the tiara, not around the head, as Macedonians did (Negron 2021, 21).

The chiton of Alexander the Great

When Darius died in 330 B.C. and Alexander proclaimed himself the King of Asia, he adopted some items of Persian court dress from Darius (Collins 2012; Negron 2021, 17; Plut. *Alex* 34.1, 45.3–4; Stewart 1993), including his diadem (Olbrycht 2014, 41, 42). There are some inconsistences between the terms for garments used by various ancient historians, lexicographers (Collins 2012, 388–389), and recent scholars, but they all agree that Alexander took over Darius' purple chiton mesoleukos or dialeukos, which he used as an upper garment or overcoat (Olbrycht 2014, 46). This implies that the undergarment of the Macedonian chiton became a Persian upper garment worn by Alexander, transliterated as sarapis, which was specifically a royal garment (Collins 2012, 388–389). Indeed, as we have shown above, both words, mesoleukos and dialeukos, have the same meaning of the Persian sarapis.

In particular, according to Ephippus of Olynthus, contemporary of Alexander (Collins 2012; *FrGrH* 126 F 5.26–28 = Ath.12.537e-38b), quoted by Atheneus (FGrH 126 F 5.26–28 = Ath. 12.537e-38b), Diodorus (17.77.4–5), and the Metz Epitome (1.2), Alexander wore a purple "chlamys" (*χλαμύς*) and a purple "chiton" (*χιτών μεσόλευκος*) with a white middle layer almost every day. Thus, with the adaptation of the Persian garment, there was some confusion about the terms for garments used by Greeks and Persians, because the Greek chiton mesoleucos became the Persian sarapis. From now on, we will use the term "sarapis" for the purple garment of Alexander with the white middle and the terms "chlamys" and "chiton" in inverted commas to avoid mismatch of the ancient texts. This "chiton" was sacred (as Alexander was the son of Zeus-Amun with horns) and unique for him who was the King of Greece and Persia and Pharaoh of Egypt (i.e., a god), as no one else was allowed to wear it (Xen. *Cyr*. 8.3.13). Finding such a "chiton" in a tomb in Vergina would certainly identify that tomb as belonging to Arrhidaeus and the chiton to Alexander. The defining feature of whether a chiton was a Macedonian or Persian sarapis is not in its length (long for chiton or short for *chitoniskos*) but the presence of a white layer (wadding/filler/padding) sandwiched between the purple parts, which is of Persian origin (Stewart 1993, 91). A sarapis was an overcoat with or without an undergarment (Olbrycht 2014, 46).

The reconstructed colors of the garments in the Alexander Sarcophagus from Sidon using sculptural polychromy (Brinkmann, Dreyfus, and Koch-Brinkmann 2017, fig. 55) show Alexander in the long battle scene wearing a white "chiton" and a purple "chlamys" (Variant C). However, there are three variants of this color reconstruction, two of which, A and B, show a purple "chiton" with a purple "chlamys" instead of a white "chiton" (see e.g., Brinkmann, Primavesi, and Hollein 2008, fig. 37; Brinkmann and Wunsche 2007, fig. 298; Figure 1). The reconstruction with Variant C and the white chiton is, therefore, in doubt. It should be noted that these two purple variants, A and B, of the Alexander Sarcophagus lack the royal purple with a royal white middle layer. Perhaps this is due to the fact that either the cross-section of the "chlamys" does not appear in the sculpture, the artist did not bother with such a detail, or the method of polychromy was not enough to show this detail.

It is worth noting that all three reconstructions of the Sarcophagus have revealed an inner lining of Alexander's "chlamys" decorated with a field of stars, golden discs with eight rays (see e.g., Brinkmann, Primavesi, and Hollein 2008, fig. 37; Brinkmann and Wunsche 2007, fig. 298; see Figure 1). Interestingly, such golden discs with eight rays have been found by Andronikos (1978b, 66; 1984, figs. 143–144) covering the sarcophagus and the floor of the antechamber of Tomb II. Apparently, these discs once decorated a textile (Andrianou 2012, 49). It is no coincidence that Alexander's eastern tent (canopy), covering his body, his golden throne, and his insignia, was decorated with star discs attached to a purple canopy, imitating the heavens (Paspalas 2005, 79). It seems part of this tent was taken to Rome (Plin. Nat. 34.48) and part to Macedonia. It should be added that the Greek word for the eastern tent is *ουρανίσκος*, which is the diminutive for *ουρανός*. Liddell and Scott's recent edition (1927) gives the wrong translation (in the present context) as "roof of the mouth" (see e.g., Paspalas 2005, 81), which does not make any sense. The correct translation is given by Liddell and Scott, 8th Edition (1882), as "a little heaven or sky" for a canopy or the top of a tent. This translation implies that the canopy which imitated the sky was decorated by golden star discs such as those found in Tomb II. Thus, the

Figure 1. Color reconstruction of Alexander the Great wearing his "chlamys" in the battle between the Greeks and Persians on the Alexander Sarcophagus. Note the eight-ray golden star discs depicted on his "chlamys," which are the hallmark of Alexander's property. This is compelling evidence that the gold stars found in Tomb II belonged initially to Alexander, as his canopy, which imitated the sky, was decorated with them (after Brinkmann and Wunsche 2007, fig. 298; Brinkmann, Primavesi, and Hollein 2008, fig. 37).

disintegrated textile found in Tomb II with the eight-ray star golden discs may originate from Alexander's tent, which was decorated with these golden stars. The eight-ray star golden discs are the hallmark of Alexander's property. This is compelling evidence that the gold stars found in Tomb II initially belonged to Alexander. It is interesting that, according to Huber (2019), this is the true Sarcophagus of Alexander III, produced at Babylon and later reused for Abdalonymus of Sidon.

It can be concluded that Alexander's Persian sarapis ("chiton") had a unique structure. It was sacred and extremely precious, as it was made of royal purple external layers sandwiching a white middle layer. For instance, to dye a small piece of cloth required enormous numbers of the *murex* gastropods: to dye an entire chiton would cost a fortune (see below). An unidentified and inconspicuous material has been found at Vergina along with the golden oak wreath and the bones of the occupant within the golden *larnax* (ossuary) of the main chamber of Tomb II. The aim here is to determine whether the royal "chiton" of Alexander's sarapis can be identified as the inconspicuous material found in Tomb II of Vergina.

Material and Methods

The methods used to analyze the unidentified material found in the golden chest (larnax) in the Royal Tomb II of Vergina were non-destructive, such as optical microscopy, scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDXA), Fourier-transform infrared spectroscopy (FTIR), x-ray diffraction (XRD), high-performance liquid chromatography with photodiode-array detection (HPLC-DAD), and mass spectrometry gas chromatography-mass spectrometry (GS/MS) (Arvaniti 2019; Maniatis et al. 2014). A thorough search of the ancient and contemporary literature was also done.

Results and Discussion

The insignia of Alexander the Great

All the paraphernalia of Alexander mentioned by Diodorus, apart from the throne, match those found in Tomb II at Vergina (Bartsiokas 2000; Bartsiokas, Arsuaga, and Brandmeir 2023; Borza 1987; Borza and Palagia 2008; Collins 2012; Negron 2021; Stewart 1993; contra Hammond 1989) such as the royal diadem (Andronikos 1984, fig. 139), the golden scepter, and the armor, such as the iron helmet, the collar, the shield, and the cuirass (Borza and Palagia 2008 and references within; Stewart 1993 and references within; Table 1). In particular, when Alexander the Great died in Babylon, a royal tent was set up with Alexander's body in it, along with his insignia given to his half-brother Arrhidaeus, such as his wreath, his diadem, his "tunic" (or "chiton" with a white middle, i.e., sarapis), his scepter, and his armor (Borza and Palagia 2008, 108 and references within; Stewart 1993 and references within). As mentioned by Diodorus Siculus (18.60.6., 18.61.1., 19.15.4.) ¨ … *εκ της βασιλικής γάζης κατασκευάσαι χρυσούν θρόνον, εν ώ τεθέντος του διαδήματος και σκήπτρου και στεφάνου …* ¨ (" … from the royal treasury a golden throne was made upon which were placed [Alexander's own] diadem, scepter, and wreath … "); " … ως αν πολυχρύσου της βασιλικής ούσης γάζης. ευθύς ούν κατασκευασθείσης μεγαλοπρεπούς σκηνής ό τε θρόνος έχων το διάδημα και το σκήπτρον ετέθη και τα όπλα … " (" … from the royal treasury full of gold a magnificent tent was constructed, a throne on which the diadem, the scepter and the arms were placed … ").

Table 1. The paraphernalia of Alexander and their possible correspondence to the finds from Tomb II. Of course, there are many items of Alexander's that have not been found in Tomb II. For references, see the text.

Evidence from ancient sources and archaeology	Evidence from Tomb II
The sacred shield from Ilium depicting Achilles and Penthesilea. The same scene in Roman medallions depicting a shield transported to Rome by Caracala.	Shields, one of which depicts Achilles and Penthesilea.
Abukir medallions depicting the wreath Alexander received from Nike. Mentioned also by Diodorus.	Golden oak wreath. One of the royal insignia. Since it was found in the golden ossuary along with the purple and whitish cotton textile, the latter should be also one of the royal insignia.
Alexander's purple "chiton mesoleucos," sarapis (as upper garment/overcoat) adopted by Alexander from the Persian royal costume with white stripes. Put on by Arrhidaeus in Babylon.	The purple and whitish textile in the golden ossuary identified as "chiton mesoleucos," sarapis. It is also depicted on the sixth hunter of the frieze.
Scepter (*caduceus*) of Persian origin placed on the golden throne of Alexander and depicted in the Porus medallion. The throne was one of the royal insignia. Apparently, the throne ended up in Egypt and the scepter in Vergina.	Long, gold-sheathed scepter of Persian origin. It is now considered lost or destroyed. As the scepter passed down to the next king, Cassander ought to have buried Arrhidaeus with the scepter.
Alexander's Sarcophagus: inner lining of Alexander's "chlamys" decorated with a field of eight-ray golden star discs. Royal Persian canopy (tent) imitating the sky with stars.	The eight-ray golden star discs of the disintegrated "canopy" in the antechamber covering the sarcophagus and the floor.
Diadem in combination with kausia. The diadem of Alexander (third hunter from the left) is shown in the hunting scene of the Alexander Sarcophagus. The diadem was part of the regalia. It was put on Alexander's golden throne and was worn by Arrhidaeus.	Gilded silver regal diadem. Adaptation of the diadem from a headband ribbon to a gilded one and from a symbol of victory to a symbol of royalty in 330 B.C. Kausia depicted in the frieze.
Golden olive wreath.	Olive wreath of the fifth hunter in the frieze.
Cuirass (mosaic of Pompeii).	Cuirass.
Iron helmet.	Iron helmet.
Four-horse Persian chariot.	Four horses were found near Tomb II.
Bows and arrows.	Gilded-silver *gorytus* (or quiver, a case for a bow and arrows).
Sword.	Swords.
Drinking cups and arms transported to Rome by Caracala.	Drinking cups.
Arms, Persian belt, gorget, corselet, and signet ring.	Arms and armor and iron collar.

The scepter from Tomb II was "a long cylindrical object, poorly preserved, whose core … was some kind of bamboo. The outside of this object was covered with cloth and gold in alternating layers: it seems almost unavoidable to interpret it as a scepter" (Andronikos 1978a, 38). However, it has disappeared from the literature since 1978 (see e.g., Andronikos 1978a, 1978b) when Andronikos realized that it is evidence of a Persian origin, as Greeks did not use scepters (Negron 2021, 26), and that it was one of the insignia of the Persian Great Kings and Alexander (Negron 2021, 25). Thus, a scepter would be conclusive evidence that Tomb II postdates Alexander and belongs to Arrhidaeus. Scepters passed from one king to the next (Negron 2021, 25). Should Andronikos have admitted the presence of the scepter, his belief in the Tomb II/Philip II identification would have collapsed

(Negron 2021, 25). Thus, he opted to claim that he misinterpreted the scepter and then made it vanish (Borza 1987). Since then, the scepter was "dematerialized" and not exhibited. Fortunately, there is a good photo of it shown in situ in the center right of figure 104 by Loukopoulou and Hatzopoulos (2006; Figure SM1) and a drawing of it by Drougou (2005, 33, fig. 16; see Figure SM1), both of which confirm its existence. It is also shown by Andronikos (1984, fig. 72). If it was subsequently destroyed does not mean it did not exist. Some scholars have gone overboard and tried to make the scepter disappear even from the ancient sources: for instance, Kyriakou (2014, 279) claimed that, "According to Diodorus Siculus the royal insignia were the throne, the diadem and the wreath," avoiding mention of the scepter from the ancient source.

The mention of Alexander's wreath by Diodorus (18.60.6.) and its possible correspondence to the wreath of Tomb II at Vergina have gone unnoticed by the scholarly literature so far. Alexander was regarded as the son of Zeus and Amun. In other words, he claimed to be a god. The oak tree was the sacred tree of Zeus (Kyriakou 2014, 275). That is why the two sons of Alexander (Alexander IV and Hercules) were buried with golden oak wreaths in Vergina (see e.g., Kyriakou 2014). Thus, it is expected that Alexander's wreath was also a golden oak wreath, which was inherited by Arrhidaeus, as with some of Alexander's other insignia. It is not coincidence that the wreath of Tomb II is a golden oak wreath, despite the fact that Arrhidaeus was not the son of Zeus. Arrhidaeus would not have such a precious wreath made for him specifically (Andronikos 1984, fig. 137; Kyriakou 2014). Alexander's wreath is depicted in the Porus medallions, where Alexander is crowned by Nike (see e.g., Borza 1987, 113). The thickness of its annulus is consistent with that of Tomb II. Could it belong to Philip II? According to Diodorus Siculus (16.92.1), just before Philip II was assassinated, many individual notables and most of the important cities offered him golden wreaths (i.e., crowns) for the celebrations of the marriage of his daughter (perhaps as an excuse for funding his campaign in Asia). What happened to them? Apparently, they were used by Alexander to finance his campaign to Asia, as Macedonia was in a state of bankruptcy and he could not afford to spend a fortune and the time to make such an invaluable wreath. Of course, none of these wreaths he accepted as presents would have matched the richness of the golden oak wreath of Tomb II. The wreath of Tomb II, therefore, is not expected to belong to Philip II (contra Kyriakou 2014). Cassander was in a hurry to become a king, so he had neither the time nor the wealth to make such a precious wreath, especially for an unimportant king like Arrhidaeus (no heroon was built for him), who was already dead. It is likely, therefore, that the golden oak wreath found in the chamber of Tomb II is the sacred golden oak wreath of King and Pharaoh Alexander the Great. In contrast, the female wreath from the antechamber of Tomb II is a gold myrtle wreath without acorns. Eurydice was an Argead and the leader of the army. She was bound to have inherited such a precious wreath from her grandmother, who was Philip's mother and a queen, too. Indeed, the myrtle wreath became a personal object of the female occupant of Tomb II (Tsigarida 1987, 913).

Did the wreath belong to Alexander? His diadem, and apparently the "chiton," were passed to his half-brother Arrhidaeus after Alexander died (Curt. 10.6.4, 10.6.11, 10.7.13; Diodorus 18.60–63; Negron 2021, 33). Indeed, Arrhidaeus put on the "chiton" (sarapis) of Alexander, the one that had been placed on the golden throne (Borza 1987, 110; Curt. 10.6.4, 10.7.13). As successor of Alexander, the sole surviving Argead King and son of Philip II, Arrhidaeus had the right to inherit some of the insignia of Alexander. It is likely his sacred wreath was passed to Arrhidaeus, too. Indeed, the wreath is the most impressive, elaborate, heavy, exquisite, and rich wreath in Greece (Kyriakou 2014, 264, 275). However, Arrhidaeus (Philip III) was the least important of the Macedonian kings. Thus, the wreath perhaps initially belonged to Alexander, and then Arrhidaeus inherited it from Alexander as with, e.g., his diadem: Alexander's diadem (*περσικόν διάδημα*) is depicted on the third hunter from the left in the long hunting frieze on the Alexander Sarcophagus (Bey and Reinach 1892; Graeve 1970). The hunting scene, with Persians present, apparently took place after Alexander became the King of Asia, and the battle scene against the Persians came before it. Being the heaviest wreath in Greece (Kyriakou 2014, 264, 275) is indicative of its Persian origin because from the royal treasury in Persia, a golden throne had already been made (see e.g., Diodorus 18.60.6., 18.61.1., 19.15.4). So, there was already plenty of Persian gold to make such a wreath. Besides, Alexander received lots of golden wreaths from cities as presents while in Asia.

In conclusion, because the golden oak wreath from Tomb II 1) indicates connections with Zeus, 2) is mentioned by Diodorus, and 3) is consistent with that of Alexander shown in the Porus medallions and because 4) Philip II and Alexander would not have spent so much gold to make such a wreath while they were preparing their campaign to Asia, especially when Macedonia was bankrupt, 5) it is too rich to belong either to Arrhidaeus or Philip II, 6) the large amount of gold used for the wreath indicates a Persian origin, because a golden throne had already been made from the royal treasury in Persia, 7) it is not the only insignia of Alexander which corresponds to the items found in Tomb II, 8) Arrhidaeus was not a son of Zeus, and 9) it was very important, as it was placed within the golden ossuary along with Alexander's sacred "chiton" sarapis, a working hypothesis is suggested that the wreath found in the golden ossuary in the chamber of Tomb II is the sacred wreath that once belonged to Alexander the Great, inherited by Arrhidaeus along with some of the other insignia of Alexander (see Table 1). It seems Cassander placed them inside Tomb II in 316 B.C., as Arrhidaeus was the last Argead and Cassander wanted to become the next king. Similarly, the diadem and the scepter of Tomb II seem to have belonged initially to Alexander. Arrhidaeus therefore, was buried in Tomb II and Philip II in Tomb I.

The discovery of the inconspicuous material in the golden ossuary

Within the stone sarcophagus of the main chamber of Tomb II rested a golden casket (larnax) which contained a male skeleton, a golden wreath, and many pieces of an unidentified multilayered material which Andronikos (1984, fig. 35) and Kyriakou (2014, 273) misidentified as a purple fabric wrapping the bones of the male occupant. Drougou (1987, 306) erroneously referred to it as made of wool. It should

be emphasized that this material is different from the two trapezoidal, gold-embroidered purple textiles correctly identified by Andronikos (1984) as winding sheets wrapping the female bones in the antechamber. Both of these textiles are shown in the photos of the golden larnax of the female as soon as the larnax was opened (Andronikos 1984, figs. 156–157) and were reported to be made of wool (Arvaniti 2019; Hofenk de Graaff 2004, 272). These textiles are now restored and exhibited in the Vergina Museum.

The layers of the material

Some of the pieces of the unidentified material had four layers (purple textile, beige layer with huntite and clay, white huntite, and purple textile) and some had six layers (purple textile, beige layer with huntite and clay, white huntite, purple textile, white huntite, and purple textile), as reported by Arvaniti (2019, fig. K.5.1–54). In other words, it had two whitish layers between three purple ones (or one whitish layer between two purple ones). The fabric was found in many pieces, some of which were adhered to several bones (Arvaniti 2019; Maniatis et al. 2014). Experiments have shown that it was placed on the male bones after their cremation (Arvaniti 2019; Arvaniti et al. 2016). This fabric is unique to Greece and exotic. This is consistent with the fact that the female in the antechamber of Tomb II does not have any huntite material within her golden chest (larnax) but merely gypsum scattered on her bones (Arvaniti et al. 2016), as she was green cremated (Bartsiokas, Arsuaga, and Brandmeir 2023). Because the unidentified material in the main chamber presents some similarities to the ancient Egyptian cartonnage that was used for funeral masks (Dodd et al. 2009), Maniatis and colleagues (2014) and Arvaniti (2019) speculated that it was most probably a funeral mask of Philip II. However, there is neither ancient source to verify this claim nor evidence to support that Philip II was buried in Tomb II (Bartsiokas, Arsuaga, and Brandmeir 2023; Huber 2019).

The royal purple cotton and the FTIR of the material

The question is why this inconspicuous and unimportant (by today's standards) material with no decoration was so precious as to be included in the golden casket along with the bones of the occupant and his golden wreath? At the time of Alexander, royal purple dye was incredibly expensive (Karapanagiotis 2019), as the shell was hard to find and *murex* production was difficult (see e.g., discussion of a *murex* processing works from Cyrenaica by Gill and Flecks [2007]). It was always associated with the dress of royalty (Homer *Iliad* 4:141–145, 24:788–796; *Odyssey* 4:133–136). Where, then, did Arrhidaeus find it? When Alexander conquered the Persian city of Susa in 331 B.C., he allegedly found 5000 talents of purple in the treasury of the palace of Darius III which had been stored there for 190 years, and its color remained still fresh (Plutarch *Alex.* 36.1). It is not clear whether Plutarch was referring to the value or to the weight of the cloth. Either way, this is a phenomenal amount. Apparently, the "chiton" of Alexander was made out of this purple cloth. Indeed, since the purple textile was found in the golden ossuary along with Arrhidaeus' bones and his golden wreath, it must have been of great importance for the occupant (Arvaniti 2019), as it was for Alexander, the original owner of the purple "chiton" (sarapis) which was later inherited by Arrhidaeus.

To identify the nature of this material, Arvaniti (2019) applied FTIR. She showed that the purple layer contained royal purple, as expected (Arvaniti 2019). In particular, the FTIR spectra and the GC-MS of the purple layer(s) (Arvaniti 2019, figs. K.5.1–40, 59–60, K.5.1–53, 71) show the presence of royal purple. She identified the vibrations at 1024, 1058, 3339, and 3277 cm^{-1} as either cotton or linen (Arvaniti 2019, 71). Furthermore, the vibrations at 1031 and 1057 cm^{-1} and the wider vibration at around 3300 cm^{-1} are consistent with those of cotton (see e.g., Suomela et al. 2023). The layer of the purple textile, which is next to the beige layer of huntite and clay, contains sugars associated with plant fibers (Arvaniti 2019, 72; Maniatis et al. 2014). However, sugar deposits are produced either from the cotton plant itself or from phloem-feeding insects of cotton (Abidi and Hequet 2005; Hequet and Abidi 2002). Flax fibers have no sugars on either fibers or fabric. The textile, therefore, in the purple layer must be cotton. Such sugars that characterize plant fibers, i.e., cotton, have also been found in the beige layer (Maniatis et al. 2014).

The beige layer of the textile with some huntite and clay is the only one in which perhaps pine resin and beeswax were found (Arvaniti 2019, 72). However, waxes derive from the outermost layers of the cotton fibers called cuticles (Chung, Lee, and Choe 2004), consistent with the presence of cotton. Their peaks, located at 2918 cm^{-1} and 2850 cm^{-1}, could originate from the presence of wax present on the surface of the primary cell wall of cotton (see e.g., Abidi, Hequet, and Cabrales 2011). Such peaks of wax were detected in the purple layer of the textile, too (Arvaniti 2019, fig. K.5.1–53). The fabric might have been treated with resin to enhance the physical properties, such as crease recovery, abrasion resistance, and smoothness (see e.g., Tania, Kabir, and Uddin 2018). Polysaccharides were detected only in the purple and beige layers (Arvaniti 2019). If they belong to a gum—which is a resin—then they might have been used as a binding medium (see e.g., Scott et al. 2009). Similarly, the egg white, found only in the white and purple layers, might have been used as a binding medium (see e.g., Scott et al. 2009). In conclusion, the FTIR spectra are consistent with a royal purple cotton identification of the textile material in the main chamber of Tomb II.

The huntite of the material

Physical, chemical, and microscopic analyses of the unidentified material showed that it is a peculiar textile with many layers made up of two external layers of royal purple and one or two whitish layers in the middle rich in huntite (Arvaniti 2019, fig. K.5.1–54; Antikas and Wynn-Antikas 2016; Maniatis et al. 2014). Arvaniti (2019) found, using FTIR and XRD, that all the layers contained some quantity of huntite. Huntite is a brilliant white mineral $CaMg_3(CO_3)_4$ (Arvaniti 2019). Huntite ore has been found in Greece (Arvaniti 2019), Turkey (Akbulut and Kadir 2003), eastern Iran (Abedi 1995), and the Trucial coast, near Abu Dhabi, in the Persian Gulf (Kinsman 1967). The last area belonged to ancient Persia. However, the origin of the Vergina huntite was not possible to determine with certainty, despite the analyses Arvaniti (2019, 205) has done, mainly due to the lack of specimens from Persia. Thus, there are some reservations as

to whether the Vergina huntite is from Greece (Arvaniti 2019, 205). This is consistent with the fact that lead white (lead carbonate) was used for white coloring in ancient Greek art (Kakamanoudis 2012) and the Tomb II frieze (Brecoulaki et al. 2023, 105, 127–134). Surely, should they have known the location of huntite in Greece, they would have used it. But they did not. The origin, therefore, of huntite in the unidentified material is expected to be exotic.

The use of huntite as a textile coloring was reported by Scott and colleagues (2004). Apparently, huntite was used because it is a brilliant white material of dazzling whiteness, and its combination with the royal purple was a symbol of royalty in Persia adopted by Alexander. Thus, the huntite-purple textile found in Royal Tomb II is unique in Greece, as unique as the sarapis ("chiton") of Alexander. Clay has also been found in the purple and the beige layers. The use of clay (kaolinite) might have been to produce a base layer for the application of the purple colorant (see e.g., Papliaka et al. 2017). However, the clay might have been part of the authigenic huntite (see e.g., Akbulut and Kadir 2003).

The microscopy of the material

Arvaniti (2019) turned to microscopy for confirmation (see e.g., Peets et al. 2019) of whether the textile is linen or cotton. The key characteristics of flax (linen) are the straight, cylindrical shape and bamboo or rod-like fibers (Betts et al. 1994; Haugan and Holst 2014). The long channel (lumen) in the middle of the flax fiber looks like a narrow line, contrary to those of cotton. Linen is not easy to dye. These characteristics of linen are quite unlike to those of the textile in the main chamber of Tomb II examined by Arvaniti (2019).

Cotton fibers are flat with abrupt bends and ribbon-like twists around the axis (also called convolutions, reversals, or spirals), which give cotton an uneven surface and form a long and wide channel in the middle (see e.g., Alonso-Felipe et al. 1995, fig. 3; Paiziev, Saranga, and Levi 2019, fig. 6). Such channels and convolutions appear in Arvaniti (2019, fig. K.5.1–50) and Maniatis and colleagues (2014): the fibers have a curly appearance and are not straight or cylindrical. The twisting is evidenced by the narrowing and widening of the fibers along their axes. Cotton fibers are much finer, causing fiber entanglement, as the one seen in the clustered (spongy) appearance of the degraded textile examined by Arvaniti (2019, fig. K.5.1–50) and Maniatis and colleagues (2014). Thus, these channels and convolutions are evidence that the textile examined by Arvaniti (2019) is cotton. Thus, microscopy confirms the identification of cotton by FTIR. This finding is consistent with the presence of cotton in the funeral pyre textile on the roof of Tomb II (Moraitou 2007).

The analyses of the material match exactly the description of Ephippus and Diodorus of the white and purple royal "chiton" worn by Alexander the Great mentioned above. Arrhidaeus inherited this sacred chiton from his brother Alexander. Alexander's father, King Philip II, never wore such a "chiton," as it signified a Persian King (Collins 2012). Only Alexander adopted the Persian "chiton" (sarapis). By the end of the 6th century B.C., in the Persian Empire (which included Egypt, India, and modern Bahrain), cotton textiles were a luxury commodity (Álvarez-Mon 2015). The presence of cotton in Greece prior to Alexander had little meaning (Moraitou 2007; Suomela et al. 2023). The identification of cotton in Tomb II is quite exciting, as it is a very rare textile in ancient Greece (there is no endemic cotton in Greece), and, with its connection with Persia and Egypt, a conclusive argument for a post-Alexander date for Tomb II can be made. The implications for the occupant of Tomb II being Arrhidaeus are clearly important. Cotton was introduced to Greece and Europe by Alexander's army following the conquest of the Persian Empire (Plut. *Eum.* 6.1–2; see e.g., Olbrycht 2014, 47). Its cultivation started much later in Greece in about the 2nd century A.D. (Primentas 1960). The implications are that Tomb II postdates Alexander, and its occupant is Arrhidaeus.

In conclusion, all the evidence from FTIR, microscopy, and the presence of sugars show that the textile of the unidentified material in Tomb II is confirmed to be cotton dyed with royal purple and enriched with huntite. The presence of cotton inside Tomb II and above its roof means that Tomb II belongs to Arrhidaeus, not to his father Philip II, and that the purple cotton with the white middle in Tomb II is the sacred "chiton" (sarapis) of Alexander the Great. Thus, Tomb II is dated to 316 B.C.

The iconography of the Tomb II frieze

The iconography of the "chiton" (sarapis) and "chlamys"

We have to consider the frieze of Tomb II to examine whether there is any evidence of a chiton with a white middle. Before doing this, we have to examine the composition of the frieze. Many scholars have regarded the geometric center as the center of the frieze, arguing that the most important hunter (i.e., the fifth hunter from the left) is Alexander the Great. However, there is no rule that the occupant of a tomb should be the central one. For instance, Royal Tomb I shows no occupant in its paintings, and the Tomb of Leufkadion depicts the occupant in the far left of the façade. It is impressive that the ingenious painter in such early times discovered what is used widely today, namely that placing subjects in the center of a picture would lead to a static, drab image. To improve the composition, the artist chose to place the primary subject/action off-center to create balance and harmony. Apparently, the artist knew that contrast brings harmony. Which, then, is the primary subject and the focus of the scene? Of course, it is the center of the action, i.e., the lion hunt, where the most important hunters are chasing the lion, as it was a royal privilege and none was allowed to kill a lion but the king. Indeed, the main group of hunters is the one chasing the lion (Walter-Karydi 2023, 432).

The most important hunters in the picture, therefore, are those three around the Asiatic lion: i.e., the sixth, the seventh, and the eighth hunter. The lion is also surrounded by three dogs. Having the main subject off-center creates a conduit for the viewer's eye to be guided into the image of action. Moving the subject away from the geometric center makes one's eye wander around the picture until it finds the subject. Thus, the person viewing the image is taking in the whole story of the picture. In this way, beyond the cinematic feel the artist gave the picture, it enhances the drama of the scene by changing the mood of a regular picture. This is a basic rule in today's art. In this manner, the artist gives "life" to the dead hunters. This frieze is thus the most

renowned painting of classical antiquity and can be regarded as its "Mona Lisa."

An illustration of a purple "chiton" (i.e., sarapis) with a white middle is shown on the sixth hunter, on foot in the center of the action ready to pierce the neck of the lion with his spear and inflict the final blow (see e.g., Brecoulaki et al. 2023, 130). In particular, there are two white stripes (layers) between three purple ones (see e.g., Brinkmann, Dreyfus, and Koch-Brinkmann 2017, fig. 53; Saatsoglou-Paliadeli 2004, fig. 15a; Figure 2), corresponding to those of the purple and whitish material in the chamber of Tomb II. We therefore identify the sixth hunter on foot with the purple *kausia* (hat) and the purple chiton (see e.g., Borza and Palagia 2008, 94; Brecoulaki 2006, 124, 126; Brecoulaki et al. 2023, 109; Brinkmann, Dreyfus, and Koch-Brinkmann 2017, fig. 53; Palagia 2000, 197; Saatsoglou-Paliadeli 2004, fig. 15a) as Alexander the Great. This is consistent with the fact that Alexander was hunting Asiatic lions on foot in ancient Persia (Curt. 8.1.11–19; Spawforth 2012, 189–190) to demonstrate his bravery and manliness and is also consistent with the purple kausia on his head, as the purple kausia with the diadem was worn only by Alexander (Saatsoglou-Paliadeli 1993, 138). It is also consistent with the tower in the background of the frieze that was used as a hunting stand for the hunters to look for lions (see below). This confirms that the hunt took place in a royal hunting paradise in Persia (Spawforth 2012, 190; see e.g., Borza 1987, 117; Palagia 2000, 177; Stewart 1993, 275). This supports a date later than 336 B.C. for the Tomb II frieze (Borza and Palagia 2008; Palagia 2000).

Arrhidaeus is identified as the seventh hunter on foot with the double axe, because he is in the center of the lion hunt between Alexander the Great (the sixth hunter with the mesoleucon sarapis) and Philip II (the eighth hunter) with the beard on the horse and the purple chlamys. The yellow-brown chlamys of the seventh hunter was adorned with large bands of light purple (Brecoulaki et al. 2023, 119), reflected as purple on his skin (see e.g., Brecoulaki et al. 2023). However, his chlamys at the right bottom side is purple. Apparently, the brown is the sublayer that remained after the purple surface layer flaked off due to weathering. The most important person in the scene of the lion hunt in terms of the identification of Tomb II is the central one, i.e., Arrhidaeus (seventh hunter) between Alexander (sixth hunter) and Philip II (eighth hunter). Thus, the unidentified material in the chamber is the "chiton" sarapis of Alexander the Great, which is depicted on the sixth hunter of the frieze of Tomb II. Both the sixth and seventh hunters are heroically nude and on foot to demonstrate their divine courage. For instance, Alexander was on foot when a lion attacked in Sidon or Samarkhand in a hunting paradise (park).

Figure 2. Part of the frieze of Tomb II showing hunter six (Alexander the Great) wearing a sarapis with two whitish stripes (layers) between the purple ones, which correspond to those of the material in the male ossuary of Tomb II (after Brinkmann, Dreyfus, and Koch-Brinkmann 2017, fig. 53).

The fifth hunter on a horse with the childish face (*βασιλικόν παιδίον)* and the purple chiton in the center of the frieze is identified as Alexander the IV, who was a young boy in 316 B.C., not Alexander, as speculated by Saatsoglou-Paliadeli (2004, 167). This is consistent with the wreath he is wearing, as it is a symbol of living activities (Saatsoglou-Paliadeli 2004, 162), whereas the sixth (Alexander the Great), the seventh (Philip III Arrhidaeus), and the eighth hunter (Philip II) were all dead when the frieze was painted. The fifth hunter cannot be the tomb owner because, on the one hand, he is a child and, on the other, Alexander the IV was a young boy at the time the frieze was painted, as indicated by the wreath he is wearing (Saatsoglou-Paliadeli 2004, 162). Besides, Philip III (Arrhidaeus) was around 45 years old when he died. So, he does not fit the description of a child (fifth hunter) as the occupant of Tomb II.

In conclusion, the seventh hunter is identified as Philip III Arrhidaeus and the occupant of Tomb II because he is on foot in the central position in the lion hunt between Alexander the Great (sixth hunter) and Philip II (eighth hunter with the golden spear and the purple chlamys on a horse). The fact that the seventh hunter is on foot—like Alexander used to hunt in Asia to demonstrate his bravery—shows his significance and indicates he was a king, too. Alexander is identified as the sixth hunter because he is on foot, about to inflict the deadly blow in the lion's neck, and he is the only one who wears a purple mesoleucon sarapis with a double white middle layer and a purple kausia. Cassander wanted to honor the last Argeads (Alexander the Great, Arrhidaeus, and Philip II) so that he could claim legitimacy to become the next king, so he included all three of them in the frieze. As Cassander was planning to assassinate Alexander IV (Franks 2012, 122), he had him painted to dissuade any accusations that he was involved in his later murder. Thus, the three hunters around the lion were all kings, the only ones who were allowed to strike a lion, and at the time of the painting, they were all dead.

The iconography of herbivores

The herbivore at the far left of the picture has been misidentified as a deer (i.e., a cervid) by Palagia (2000, 193, 199), Borza and Palagia (2008, 91, 93), and Brecoulaki (2006, 124). Saatsoglou-Paliadeli (2004, 111, 114, 133), Spawforth (2012, 185) and Brecoulaki and colleagues (2023, 131) misidentified it as an antelope (i.e., a bovid). However, the facial markings (brown eye-nose stripe), the prominent ears, and the black eye are quite gazelle-like (see e.g., Saatsoglou-Paliadeli 2004, fig. 7b; Figure 3). These features allow us to identify it as a female of the Persian gazelle belonging to the species *Gazella subgutturosa*, which is a bovid also known as the goitered gazelle (see Figure 3). The painter must have seen a Persian gazelle, as it is painted naturalistically, contra Brecoulaki (2006, 124), who speculated that its eye is painted hastily as a black oval stain, contrary to the eye

Figure 3. The Persian gazelle *Gazella subgutturosa*, also known as the goitered gazelle. Note the facial markings and its black eyes.

of the lion, which she claims is very realistic and detailed with the white of the sclera. Apparently, Brecoulaki (2006) has not seen a photo of the Persian gazelle in order to realize that its eye appears exactly as it is painted and presented black in the fresco without any white of the sclera (see e.g., Kingswood and Blank 1996, 2; see Figure 3). The identification of the Iranian gazelle in Vergina is consistent with the gazelles depicted in the Neo-Assyrian net-hunting images at the Nineveh palace (cf. the tenth hunter with a net in the frieze; Franks 2012, 80).

Similarly, Brecoulaki (2006) is wrong about the white sclera of the lion: the sclera of the lion is not white, but black (Figure 4). That the lion is Asiatic is evidenced by its sparse mane and prominent ears. However, the lion was not painted naturalistically but by following a usual artistic motif (contra Brecoulaki 2006). Indeed, the Greek lion was not based on real observation but on artistic conventions borrowed from Egypt and the Near East (Thomas, Touchais, and Laffineur 2014). Since Asiatic lions existed in both Persia and Greece at the time and are believed to have died out in Greece around A.D. 100 (Bartosiewicz 2009), the lion alone

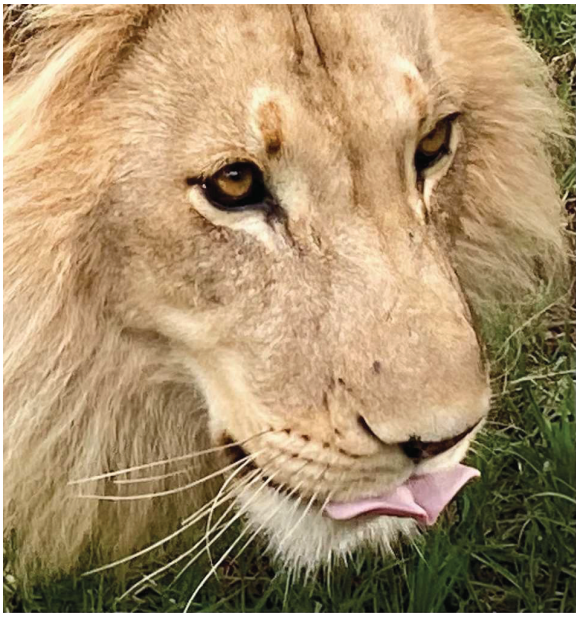

Figure 4. The head of an African lion. Note the absence of white sclera in its eyes and the presence of a black sclera instead. Photo by A. B. in Zambia.

in the frieze cannot be used as evidence of the place where the hunt occurred. The fresco of Tomb II, therefore, was not painted hastily, because the application of uniform layers and the multi-step shading is a time-consuming method (Brecoulaki et al. 2023, 113–114), which is consistent with a Tomb II/Arrhidaeus identification and the fact that Alexander, contrary to Cassander, was in a hurry to bury his father and join the Asian campaign and did not have time to have a frieze painted in such detail. Indeed, the painting in Tomb I is a hasty one.

Furthermore, the second herbivore from the left is interpreted as a male of *G. subgutturosa* because of the presence of its horns. The males have a swelling of the neck and throat during mating season which is a characteristic of the species. Such a swelling is depicted on the throat of the animal in the frieze of Tomb II. During the rut, the larynx of males bulges outwards, resembling a goiter. While these gazelles do not actually have goiter disease, the expanded throats of males in the breeding season resembles the condition (Wilson and Reeder 1993). The geographic distribution of *G. subgutturosa* is in Iran, Iraq, central Asia, southeastern Georgia (extinct), eastern Jordan, Kuwait (extinct), Oman, western Pakistan, Saudi Arabia, Syria, southeastern Turkey, the United Arab Emirates, and Yemen (possibly extinct). Gazelles did not exist in Greece in ancient times, as the last gazelles went extinct there in the early Pleistocene (Sianis et al. 2023 and references within). The above evidence shows that the gazelles depicted in the frieze are not from Greece. This means that the hunt in the frieze of Tomb II was inspired by a hunt in a hunting paradise in an Asian landscape. Thus, Tomb II postdates Alexander, which is consistent with the identification of Tomb II as belonging to Arrhidaeus (Bartsiokas, Arsuaga, and Brandmeir 2023).

Thus, the painter must have watched a Persian gazelle in Persia, since he painted it so naturalistically (contra Brecoulaki 2006). So the painter of Tomb II has to be Philoxenus of Eretria, who flourished in the age of Alexander, painted some of the battles of Alexander, and also painted for Cassander. Tomb I (Tomb of Persephone) must have been painted hastily by Nicomachus of Thebes (Andronikos 1984; Borza 1987; Brecoulaki et al. 2023, 100), who was a very fast painter (Saatsoglou-Paliadeli 2011, 286) and was famous for painting the Rape of Persephone (Pliny, *N. H.* 35.108–109), perhaps that of Tomb I. These hypotheses are consistent with the dates of the tombs, because Philoxenus of Eretria was a disciple of Nicomachus of Thebes, and Tomb II is younger than Tomb I. Nicomachus of Thebes flourished about 360 B.C. and was too old to follow Alexander in Asia, as opposed to Philoxenus of Eretria. This evidence for the ancient painters is exactly opposite to what Saatsoglou-Paliadeli (2011, 284–286) speculated about the painters, the dates, and the identifications of the two tombs and is refuted here.

The iconography of canines

Regarding the dogs, the first, third, fourth, fifth, and eighth from the left are identified as Laconian hounds, shown frequently in Greek art, and the second, sixth, and ninth are holding dogs similar to the Indian hounds, which were new to Greek art (Reilly 1993). Bone elements of Indian hounds have been found at Mohenjo Daro, which is dated to about ca. 2500 B.C. (Marshall 1931). Reilly's view is contra Saatsoglou-Paliadeli (2004, 80–84), who concealed Reilly's identification of the

second, sixth, and ninth dogs as Indian hounds. Thus, the canine evidence also points to an Asian landscape for the Vergina hunting frieze, contra Saatsoglou-Paliadeli (2004), who identifies the holding dogs as molossian hounds from Greece. The latter have a dense double-coat, which is not the case for the hounds in the frieze. Thus, the claim of Saatsoglou-Paliadeli (2004, 143) that there is a total absence of game foreign to European fauna in the frieze is refuted.

The iconography of the hunting watchtower

There is a very tall rectangular cuboid structure in the background. It has been interpreted as sacred by Palagia (2000, 194, 200), Saatsoglou-Paliadeli (2004, 90, 139–144) and Borza and Palagia (2008, 92). Here, it is interpreted as a secular hunting watchtower (stand or post). Indeed, Curtius (8.1.11-13) refers to this sort of tower in hunting paradises (i.e., game parks; see e.g., Spawforth 2012, 186, 189–190) used by Alexander and by the Persian kings in Babylon, Persia, Syria, and modern Uzbekistan and Tajikistan. This type of tower is used to observe big game in the surrounding area from a high vantage point and to look for lions. Such game parks, and consequently such towers, for hunting were unknown in Macedonia before the death of Alexander (Carney 2002, 66–67; Mullen 2019, 179–180; Palagia 2000, 177; Spawforth 2012, 186), evidence that the frieze is dated to the late 4th century B.C. (Borza 1987, 117). Indeed, Mullen (2019, 184, 227) presented seven hunts of Alexander in Asia from 332–323 B.C. and argued that there is no record of Alexander hunting prior to his campaign in Asia (Mullen 2019, 179–180; contra Mullen 2019, 35). The scene in the frieze with the hunting tower is, therefore, inspired by hunts which took place in the east (Borza 1987, 117; contra Mullen 2019, 177).

The iconography at other sites

In the frieze of Tomb III of Ag. Athanasios (Tsimbidou-Avloniti 2005), the leading person on the horse—probably an ex-general of Alexander who returned to Macedonia or Alexander V (Palagia 2017, 423)—has an indigo blue chiton, apparently from the plant indigo (*Indigofera tinctorial*) of ancient South Asia (Brecoulaki 2006, fig.1). A white stripe is clearly visible in his chiton, apparently mimicking Alexander's sarapis with the white stripe in the middle. The tomb is dated to the end of the 4th or beginning of the 3rd century B.C. The relief of Messene in the Louvre (beginning of the 3rd century B.C.) has been interpreted as Krateros rescuing Alexander from the lion (Stewart 1993, fig. 89). In view of the Vergina frieze, it is interpreted here as Alexander rescuing Arrhidaeus, owing to the double axe both figures are holding in each. For Alexander, it would be an insult for someone else to rescue him. Finally, in the sculptures thought to represent Alexander, such as the Alexander Sarcophagus, the "Demetrio" statuette (see e.g., Stewart 1993), and the ancient Greek plaque on the Alexander the Great monument in Thessaloniki, it is difficult to determine whether there is a white stripe, as these sculptures are not colored.

List of Arguments for a Tomb II/Philip III Arrhidaeus Identification

Tomb III

There is a unanimous agreement that Tomb III belongs to King Alexander IV, the son of the Great Alexander. This is important because it shows that the Great Tumulus belongs mainly to the Kings of the Argead dynasty, and this contributes significantly to the identification of Tombs I and II as belonging to either Philip II or Arrhidaeus (Bartsiokas, Arsuaga, and Brandmeir 2023).

Tomb I

The newborn

The newborn is exactly the same as that described by Musgrave (1985), as deduced from the length of its humerus. Its bones are depicted on the floor in the northwestern corner of Tomb I (Bartsiokas, Arsuaga, and Brandmeir 2023, fig. 3). No other newborns have been found in any other royal tombs in Aegae, including royal Tomb II. Since it is the only newborn known from historical sources, it is deduced that it belongs to the child of Cleopatra. This fact alone is enough for the identification of Tomb I as that belonging to Philip II, Cleopatra, and their child. No arguments against the newborn-derived evidence have been presented so far from the adherents of a Tomb II/Philip II identification, who remain silent on the matter.

The female

Her bones are depicted on the floor of Tomb I by Andronikos (1984, fig. 10) and the diary of the 1978 excavation of Professor Faklaris (1978; Bartsiokas, Arsuaga, and Brandmeir 2023, fig. 3). Her age-at-death of ca. 18 years is derived from her epiphyseal fusions, which matches the age-at-death of Cleopatra derived from historical sources, as she was the youngest Macedonian queen. This is compelling evidence for a Tomb I/Philip II identification.

The male

Some of the male bones are depicted on the floor of Tomb I (Bartsiokas, Arsuaga, and Brandmeir 2023, fig. 3; Faklaris 1978). The most conspicuous lesion is the firm synostosis (ankylosis) in the knee joint (Bartsiokas, Arsuaga, and Brandmeir 2023, fig. 6) of the male, which is consistent with the lameness of Philip II from historical sources. This is a conclusive argument that Tomb I belongs to Philip II. These skeletal elements of the male, the female, and the newborn correspond to those reported by Andronikos (1984, 86). The Vergina Museum has been unable to present any additional bones from Tomb I thus far other than those belonging to the individuals reported by Andronikos (1984) and Bartsiokas and colleagues (2015; Bartsiokas, Arsuaga, and Brandmeir 2023). Furthermore, neither the Vergina Museum nor any directors of excavations have not been able to offer either an alternative site for the provenance of these individuals or a publication which refers to them as being from a different site. It follows that the bone elements reported by Bartsiokas and colleagues (2015; Bartsiokas, Arsuaga, and Brandmeir 2023) are indeed the original ones and that they belong to the occupants of Tomb I.

Nevertheless, T. G. Antikas and colleagues (L. K. Antikas, G. Maniatis, A. Kyriakou, and A. Tourtas) claimed in a presentation "New finds from the skeletons of Tomb II at Aegae: a four-year research beyond creating data bases" delivered in the Archaeological Museum of Thessaloniki on Oct. 10th, 2014 that seven more individuals were found in Tomb I (Figure SM2). These are not full skeletons as implied, only

seven small bones (see Figure SM2). They were found in the 1977 season, excavated by S. Drougou. They came from the upper layer of the debris, along with intrusive material such as animal bones (Bartsiokas, Arsuaga, and Brandmeir 2023) and fragments of marble deriving from broken funerary stelae (Kottaridi 2020, 163). The upper layer of the debris was formed after looting had taken place by the Gauls of Pyrrhus in 276 B.C., who had abandoned the tomb. These intrusive elements derive from the Great Tumulus above Tomb I, and consequently, they do not belong to the original occupants of Tomb I. They remain unidentified, and they are enclosed in plastic bags (see Figure SM2). More importantly, they were rejected for publication, as they are absent from Antikas and Wynn-Antikas (2016). Their arguments, therefore, have no scientific basis and should be discarded until they are subject to peer review. Despite the fact that they are still unpublished, some scholars continue to mention them.

Archaeological evidence

Tomb I and its heroon are close to each other and share multiple structural and architectural similarities. Similarly, Tomb II and Tomb III are located close to each other and also share similarities; however, they are distinct from the features found in the heroon and Tomb I. This implies a chronological similarity for their construction (pre-Alexander for Tomb I and the heroon and post-Alexander for Tombs II and III). Hammond (1991), too, admitted that the heroon belonged to Tomb I, and Andronikos (1984) claimed that the presence of the heroon would make sense for Philip II but not for the mentally-afflicted Arrhidaeus.

Tomb II

The male

There are no pathologies in the male skeleton such as those mentioned in the ancient sources for Philip II: no eye injury, no evidence of warping or asymmetry of facial bones (Antikas and Wynn-Antikas 2016; Bartsiokas, Arsuaga, and Brandmeir 2023; Bartsiokas et al. 2015; Xirotiris and Langenscheidt 1981), and no evidence of lameness. The facial warping observed is due to cremation (Bartsiokas, Arsuaga, and Brandmeir 2023). Thus, the infamous facial reconstruction of Philip II with an eye injury done by Prag and Neave (1997) is refuted. The death rattle of the eye injury invention came when the paper of Prag, Musgrave, and Neave (2019, 249–250) was published, in which they provide no evidence for it. In it, they make the extraordinary claim that—despite the whole of the male skeleton presenting warping because of cremation—the warping of the facial bones is not due to cremation but is pathological (!) due to the non-existent eye injury. It is difficult to explain such a weird obsession with a non-existent injury, which is a known anatomical feature. Furthermore, Prag, Musgrave, and Neave (2019) continue to argue that I remain silent about Cyna (Cynnane), the daughter of Philip II and mother of Eurydice as if it is an important issue. Cyna was buried in Aegae, the ancient sources say. However, they do not say that she was buried with Arrhidaeus. Besides, Cyna died six or seven years before Arrhidaeus was buried. Cassander did not bury Arrhidaeus with Cyna instead of his wife (Carney 2016) because he had no obligation to her, only to Eurydice (Huber 2019). There is no evidence of hand injury, either, because of a misidentification by Antikas and Wynn-Antikas (2016) of bone elements (see e.g., Bartsiokas, Arsuaga, and Brandmeir 2023, 17) in which Antikas and Wynn-Antikas (2016) mistook a foot bone for a hand one.

The female

No newborn bones were found with the female. Regarding the absence of a newborn in Tomb II and its presence in Tomb I, Prag, Musgrave, and Neave (2019) remain silent, as all the adherents of the Tomb II/Philip II identification do. The female, therefore, is not identified as Cleopatra. Schmorl's nodes indicate horseback riding (Antikas and Wynn-Antikas 2016), consistent with an identification with Eurydice. The consistent and long-standing major argument against her identification with Adea, Queen Eurydice II, was a significant discrepancy of age between that given by ancient sources and that derived from the bones. In fact, for decades, this was the ultimate argument against the burial of Philipp III Arrhidaeus in Tomb II because Eurydice was traditionally thought to be 18 or 19 years of age after distortion of the ancient sources (Huber 2019) by, e.g., Musgrave (1990, 279), Musgrave and colleagues (2010, 12–13), Hammond (1991, 80) and Lane Fox (2011, 31–32), whereas the bones of the female from Tomb II suggest an age at death of "most probably closer to 30 years" (Antikas and Wynn-Antikas 2016, 686). However, new historical arguments provided by Huber (2019) indicate that Eurydice might have been 28–29 years old when she died (Bartsiokas, Arsuaga, and Brandmeir 2023, 7). Huber (2019, 37–40) is the one who finally resolved this major issue by providing the new historical evidence.

The male remains were cremated dry, whereas the female ones were cremated green shortly before burial. This coincides with the different postmortem treatment of Arrhidaeus' and Eurydice's bodies by Olympias (Bartsiokas 2000; Bartsiokas, Arsuaga, and Brandmeir 2023)—i.e., that the male was buried out of respect for a dead king, and the female was kept unburied out of disrespect and hatred of her until cremated by Cassander. Exposing bodies without burial is practiced by, for example, the Anga people in Papua New Guinea (Figure SM3; Higginson 1908): a similar practice is suggested to have used with Eurydice by Olympias, which would have preserved her bone collagen, resulting in green cremation. The existence of a "monumental funerary wooden house," suggested by Kottaridi (2020, 91), has no bearing on whether the remains were cremated dry or green.

There is a compressed fracture only of the medial tibial condyle of the female's left tibia, RTIIB146 (Antikas and Wynn-Antikas 2016). It is difficult to explain how this was caused during life, as the lateral condyle was not affected. It is also worth noting that there is no remodeling of this fracture (contra Antikas and Wynn-Antikas 2016). The above evidence means that the fracture was perimortem and most probably happened during cremation, because during cremation, the bones are pliable. Eurydice, therefore, cannot be excluded as the occupant of the antechamber of Tomb II, as speculated by Mullen (2019, 177) on the basis that Eurydice was nowhere recorded as lame. The presence of many weapons is consistent with Eurydice, as she was a warrior queen, and excludes Cleopatra from Tomb II, as she was a teenage bride and not related to any martial behavior or history (McLeod 2014).

Archaeological evidence

Structural and architectural similarities in Tomb II and Tomb III, which are located close to each other, downdate them to post-Alexander times (see also above). The paraphernalia of Alexander (see Table 1) correspond to those of Tomb II, such as the shield, the gilded silver diadem, the golden scepter, the star golden discs with the eight rays, the iron helmet, and perhaps the gold wreath. The weight inscriptions on the silver plate require Tomb II to be post-Philip II (Gill 2008). The support for the identification of Tomb II with Arrhidaeus is contrary to the position of Lane Fox (2011). Lane Fox fails to take proper account of the research on the coins and weights of Macedonia by Price (1991). The Gold Herakles knot from the queen's fabulous diadem (crown) found in the antechamber is dated to the last quarter of the 4th century B.C. (Nicgorski 2005). It surely belonged to Eurydice, a relative of both the old and the new Herakles (Nicgorski 2005, 115). The use of purple cotton in the textile with the two whitish layers between purple ones found in the golden ossuary is identified as the sacred sarapis ("chiton") of Alexander, which is depicted in the iconography of the frieze from Tomb II as the purple sarapis "chiton" of the sixth hunter (Alexander) with the double white stripes between purple ones. The presence of cotton is especially significant, as it downdates Tomb II. The presence of Persian gazelles in the frieze, the Indian hounds, and the watchtower are all evidence of the Asian origin of the hunting scene and date Tomb II to after Alexander. The golden stars with the eight rays in the "chlamys" of Alexander in the Alexander Sarcophagus is another compelling piece of evidence that the golden stars found in Tomb II belonged to Alexander's canopy.

Similar arguments in favor of downdating Tomb II were put forward by the ICOMOS (International Council on Monuments and Sites 2024) announcement on March 15th, 2024. Thus, there is anthropological, archaeological, and historical evidence that Arrhidaeus was buried in Tomb II and Philip II in Tomb I in Vergina, as shown by Borza (1987), Bartsiokas (2000), Borza and Palagia (2008), Bartsiokas and colleagues (2015), Brandmeir and colleagues (2018), and Bartsiokas, Arsuaga, and Brandmeir (2023).

Conclusions

It is concluded that the royal purple textile made of cotton with whitish middle layers made mainly of huntite found in pieces in the golden ossuary of the male of Tomb II at Vergina, along with the golden wreath and the bones of King Arrhidaeus, is identified as the sacred purple sarapis ("chiton"/tunic) of Alexander the Great, also depicted in the frieze of Tomb II on the sixth hunter. Thus, the golden oak wreath might belong to Alexander, too. These conclusions are supported by the identification of the Persian gazelle, the Indian hound, and the hunting watchtower in the frieze of Tomb II and are consistent with the evidence that Tomb II may also contain some of the paraphernalia of Alexander (Bartsiokas 2000; Bartsiokas, Arsuaga, and Brandmeir 2023; Bartsiokas et al. 2015; Borza 1987; Borza and Palagia 2008; Brandmeir et al. 2018) such as his silver gilded diadem, his golden scepter, his helmet, his cuirass, his tent with the eight-ray star golden discs, and the sacred shield. King Cassander buried Arrhidaeus in 316 B.C. with these precious paraphernalia of Alexander the Great, as Arrhidaeus was the last in the dynasty of the Argeads and inherited from his brother Alexander the Great. The cumulative weight of the plethora of evidence points to Tomb II/Arrhidaeus and Tomb I/Philip II identifications. We hope that the golden Sun of Vergina will shed light on the obscurantism and defensiveness that has plagued the scientific research so far for Tombs I and II.

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FigSM3. Exposing bodies without burying them is practiced by the Anga people in Papua New Guinea (Credit: Ian Lloyd Neubauer). Such treatment preserves the bone collagen as in anatomic specimens in Anatomy labs. A similar type of exposing a body it is suggested was applied for Eurydice by Olympias out of revenge resulting in green cremation.

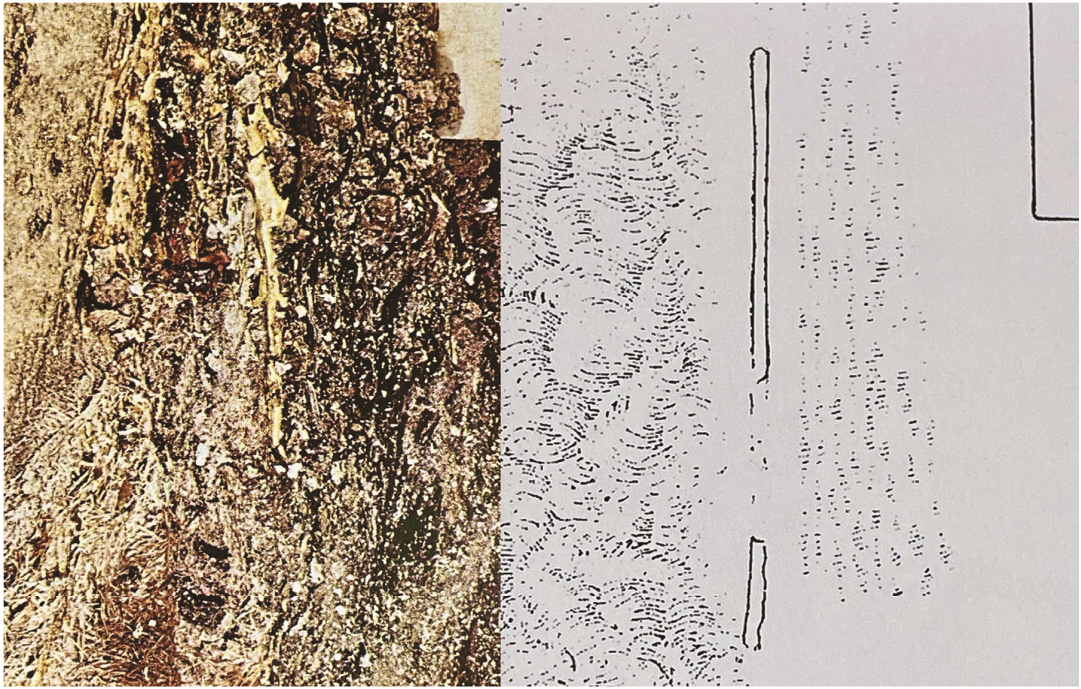

Figure SM1. The golden scepter in situ in the chamber of Tomb II. Left: a photo of it adapted from Loukopoulou and Hatzopoulos (2006, fig. 104). Right: a drawing of it adapted from Drougou (2005, 33, fig. 16). Both confirm the scepter's existence. The object in the top right hand corner is the marble sarcophagus of the male. The whereabouts of the scepter are unknown today.

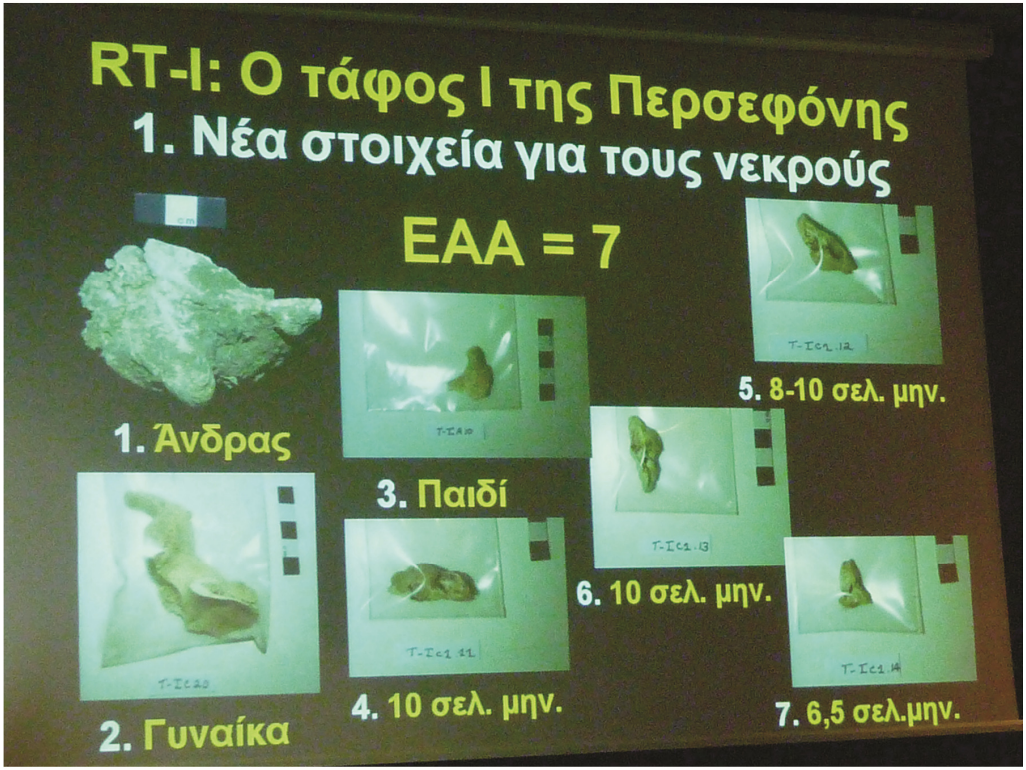

Figure SM2. The so-called seven individuals from Tomb I in plastic bags (!) as presented by Antikas and colleagues. Ten years or so after their first presentation, they still remain unpublished, unidentified, and intrusive.